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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/010,537	12/05/2001	Kazufumi Ogawa	10873.255USD1	4182
23552	7590	07/22/2004	EXAMINER	
MERCHANT & GOULD PC P.O. BOX 2903 MINNEAPOLIS, MN 55402-0903			HON, SOW FUN	
			ART UNIT	PAPER NUMBER

1772

DATE MAILED: 07/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/010,537

Applicant(s)

OGAWA, KAZUFUMI

Examiner

Sow-Fun Hon

Art Unit

1772

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8,9,11,13,14,17-20 and 69-73 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8,9,11,13,14,17-20 and 69-73 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

Withdrawn Rejections

1. The claim objection in paragraph 2 of the Office action dated 02/03/04 has been withdrawn due to Applicant's affirmation of the broad interpretation of the film as being directed to the nature of the film such that film of similar composition is "suitable for use".
2. The claim objection in paragraph 3 of the Office action dated 02/03/04 has been withdrawn due to Applicant's amendment, dated 04/28/04, of claim 73, and affirmation of the interpretation of the term "substrate" to incorporate the electrodes.
3. The 35 U.S.C. 102(b) and 103(a) rejections have been withdrawn due to Applicant's amendment dated 04/28/04.

New Rejections

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
5. Claims 69-73, 8, 11, 13-14, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van de Venne (US 4,674,842) in view of Ogawa (previously cited EP 0476 543), as evidenced by Willis et al. (US 5,266,222).

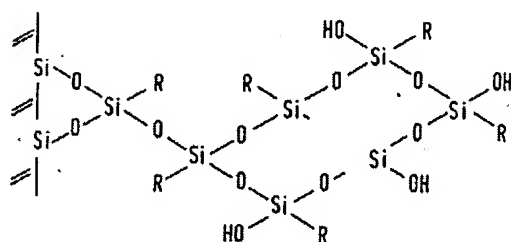
Van de Venne has a liquid crystal alignment member suitable for use in a liquid crystal display (picture display cell which comprises a liquid crystalline compound provided between

Art Unit: 1772

two substrate plates provided on their inner surfaces with an electrode and an orientation layer which gives the liquid crystalline compound a homeotropic orientation) (column 4, lines 29-39).

Van de Venne teaches a liquid crystal display cell comprising a substrate having a first surface and electrodes 4,5 (column 3, lines 55-65) and a monomolecular film (column 3, lines 10-15) formed on the first surface of the substrate (inner surface) (column 4, lines 30-35).

Fig. 2 below, of Van de Venne, shows that the monomolecular film is formed of molecules that have one portion bonded to the substrate by a covalent bond, and have Si at both ends.



Van de Venne teaches that the monomolecular alignment (orientation) film gives the liquid crystal a homeotropic alignment (orientation) (column 4, lines 30-35).

Van de Venne fails to teach a tilt angle (claims 69), a functional group for controlling a surface energy of the film with a critical surface energy (claim 70), or a material having an energy beam sensitive group and a thermoreactive group, wherein the energy beam sensitive groups are reacted and crosslinked (claim 71).

Ogawa has a liquid crystal alignment member for use in a liquid crystal display. The liquid crystal display has a first substrate provided with a first group of electrodes 11 in a matrix array, and a second substrate provided with a second electrode 15. Thereafter a silane-based surface active agent is chemically adsorbed on one or both electrode types (page 6, lines 25-35).

Regarding claims 69, 71, 20, Ogawa teaches that the molecules in the monomolecular alignment film are crosslinked in a state of alignment in a particular direction (tilted) (claim 69) (column 2, lines 50-60). Thus the bonded molecules in the monomolecular film are aligned uniformly in a particular direction. Although the molecules are not aligned by washing the molecules with a solvent after being bonded to the substrate and tilting the substrate in a desired direction to drain off the solvent, the molecules are aligned in a magnetic or electric field and subjected to an energy beam so that the energy beam sensitive groups (polymerizable groups) are reacted and crosslinked (column 3, lines 1-5) after being bonded (covalent bond) to the substrate (column 3, lines 5-10). Energy beams are sources of thermal energy. Hence the energy beam sensitive groups (claim 71) can also be thermoreactive groups which react to form crosslinks (claim 20).

Regarding claims 70, 13-14, Ogawa teaches that a portion of the silane-based surfactants may contain a carbon trifluoride group (-CF₃) functional group (column 5, lines 30-40). These different silane-based surfactants all have different critical surface energies, and provide a desired critical surface energy for the fixed film when mixed (column 5, lines 40-50), as evidenced by Willis et al.

Willis et al. gives the critical surface energy values of the film (column 10, lines 5-15) formed from mixtures of silane-based surfactants and fluoroalkyl functionalized ones (Fig. 1) of 11.5 to 23 Nm/m (dynes/cm) showing that the fluoroalkyl functionalization changes the surface energy of the film, thus allowing control over the surface energy of the film.

Ogawa teaches the same types of carbon trifluoride group (-CF₃) (column 5, lines 30-40) functionalized silane-based surfactants as those of Applicant's specification (page 26, lines 5-

15). Thus the monomolecular film comprising the mixture of silane-based surfactants and carbon trifluoride functionalized ones has a critical surface energy which overlaps the claimed range of from 15 mN/m to 56 mN/m.

Regarding claims 72-73, Ogawa teaches that the silane-based surfactant is chemically adsorbed on the electrodes either directly (claim 72) or indirectly via an insulating film (claim 73) (column 6, lines 25-35). Thus the resin film formed from polymerizing the polymerizable groups on the silane-based surfactant (column 6, lines 15-25) can also be formed on an insulating film over the electrodes, such that the substrate comprises a film (insulating) between the resin film (alignment) and the electrodes.

Regarding claim 8, Van de Venne teaches that the molecules constituting the film contain siloxane (Si-O-Si) bond chains as can be seen above.

Regarding claim 11, Ogawa teaches that the molecules constituting the alignment film are formed by mixing a plurality of types of silane-based surfactants (surface active agents) (column 2, lines 50-60) which are chemisorption molecules, due to the application of the surfactants to the surface via chemical adsorption, as described in Applicant's specification (page 7, lines 20-25). The silane-based surfactants have different molecular lengths (long and short carbon chains) (column 4, lines 30-45).

Fig. 2 on the next page, of Ogawa, is the enlarged schematic cross sectional view of the crosslinked monomolecular layer (column 3, lines 40-45) and shows that the fixed film has concavities and complexities at a molecular level.

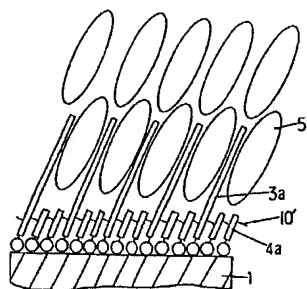


Figure 2

Regarding claim 19, Fig. 2 above, of Ogawa, shows that the surface of the resin (alignment) film has striped concavities 4a and convexities 3a.

Regarding claims 17-18, Fig. 1(a) below, of Ogawa, shows that the unsaturated vinylic groups are introduced as side chains in the resin film. These vinylic hydrocarbon -HC=CH- groups are polymerizable, being energy beam sensitive (ultraviolet rays) (column 4, lines 25-30). Energy beams are sources of thermal energy. Hence the vinylic groups are also thermoreactive.

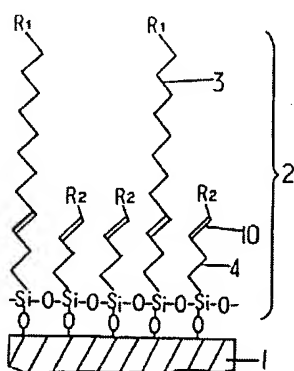


Figure 1 (a)

Ogawa and Van de Venne both use silane compounds to form monomolecular alignment layers for liquid crystal displays. Therefore it would have been obvious to one of ordinary skill in the art to have used Ogawa to modify the silane-based alignment layer of Van de Venne in order to obtain an alignment layer with the desired surface energy control and molecular morphology.

Art Unit: 1772

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Van de Venne in view of Ogawa, as evidenced by Willis et al., as applied to claims 69-73, 8, 11, 13-14, 20 above, and further in view of Mazaki et al. (US 5,460,748).

Van de Venne teaches a liquid crystal alignment member suitable for use in a liquid crystal display, comprising a substrate having a first surface and electrodes, a monomolecular film formed on the first surface of the substrate, the monomolecular film being formed of molecules that have one portion bonded to the substrate by a covalent bond, are aligned uniformly in a specific direction, and have Si at both ends.

Furthermore, Van de Venne teaches carbon chain R (Fig. 2) (column 2, lines 15-20), but fails to teach that it contains a carbon which has optical activity.

Mazaki et al. teaches that introducing an optically active unit into the polymer (column 4, lines 65-70) produces a structure which has both tilt orientation and twisted structure (column 5, lines 1-5).

Therefore it would have been obvious to one of ordinary skill in the art to introduce a carbon with optical activity in the carbon chain of Van de Venne in order to obtain an alignment layer with both tilt and twist alignment capability., as taught by Mazaki et al.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 1772

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number is (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon, can be reached at (571)272-1498. The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SH
Sow-Fun Hon

07/21/04


HAROLD PYON
SUPERVISORY PATENT EXAMINER
1772

7/21/04